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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experiment sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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ED 068541

TM 002 022

Development of USES Aptitude Test Battery

for

Coding Clerk

(clerical) 219.388

U.S. DEPARTMENT OF LABOR

MANPOWER ADMINISTRATION

ED 068541

Technical Report on Development of USES Aptitude Test Battery

For . . . .

Coding Clerk (clerical) 219.388

S-410

(Developed in Cooperation with the
New Jersey State Employment Service)

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March 1968

FOREWORD

The United States Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

Charles E. Odell

Charles E. Odell, Director
U. S. Employment Service

GATB Study No. #2696

DEVELOPMENT OF USES APTITUDE TEST BATTERY

FOR

CODING CLERK (clerical) 219.388-074

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Coding Clerk (clerical) 219.388-074. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
V - Verbal Aptitude	95
Q - Clerical Perception	95
K - Motor Coordination	90

RESEARCH SUMMARY

Sample:
64 female Coding Clerks employed in New Jersey

Criterion:
Supervisory ratings

Design:
Concurrent (test and criterion data were collected at approximately the same time.)

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analysis of aptitude mean scores, standard deviations, and selective efficiencies.

Concurrent Validity:
Phi Coefficient (ϕ) = .29 ($p/2 < .01$)

Effectiveness of Norms:
Only 64% of the nontest-selected workers used for this study were good workers; if the workers had been test selected with the S-410 norms, 74% would have been good workers. 36% of the nontest-selected workers used for this study were poor workers; if the workers had been test selected with the S-410 norms, only 26% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	64%	74%
Poor Workers	36%	26%

SAMPLE DESCRIPTION

Size:

N = 64

Occupational Status:

Employed workers

Work Setting:

Workers were employed by the following companies:

1. Clare Brown Associates, Inc., Elizabeth, New Jersey
2. The Gallup Organization, Inc., Princeton, New Jersey
3. R. H. Bruskin Associates, New Brunswick, New Jersey

Employer Selection Requirements:

Education: Ability to read and understand directions and instructions in English.

Previous Experience: None

Tests: None

Principal Activities:

The job duties for each worker in the final sample are comparable to those in the job description in the Appendix.

Minimum Experience:

All workers had at least two months of job experience.

TABLE 2

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

	Mean	SD	Range	r
Age (years)	37.9	11.7	19-64	-.055
Education (years)	12.1	1.0	10-16	-.054
Experience (months)	21.4	22.5	2-93	.086

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B, were administered on various dates in September and October, 1965, November and December, 1966 and January, 1967.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency made at approximately the same time as test data were collected. Ratings and re-ratings, obtained at least two weeks later, were made by the immediate supervisor of each worker.

Rating Scale: An adaptation of USES Form SP-21, "Descriptive Rating Scale," was used. The scale (see Appendix) consisted of seven items covering different aspects of job performance. Each item had five alternatives corresponding to different degrees of job proficiency.

Reliability: A reliability coefficient of .88 was obtained between the initial ratings and re-ratings, indicating a significant relationship. The final criterion score consisted of the combined score of the two ratings.

Criterion Score Distribution:

Possible Range:	14-70
Actual Range:	17-69
Mean:	47.7
Standard Deviation:	13.6

Criterion Dichotomy: The criterion distribution was dichotomized into low and high groups by placing 36% of the sample in the low criterion group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers". The criterion critical score is 42.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of the job duties involved and a statistical analysis of test and criterion data. Aptitudes V and Q which do not have a significant correlation with the criterion were considered for inclusion in the norms because the qualitative analysis indicated that Aptitude V and Q were important for the job duties. In addition, the sample had a relatively high mean score and relatively low standard deviation on Aptitudes V, Q, and K. With employed workers a relatively high mean score may indicate that some sample pre-selection has taken place. Tables 3, 4, and 5 shows the results of the qualitative and statistical analysis.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performed.)

Aptitude	Rationale
G - General Learning Ability	Important to learn and understand work processes and to make appropriate judgements.
V - Verbal Aptitude	Important to read and understand written materials.
Q - Clerical Perception	Important in the editing, scanning, tallying and collating of written materials.

TABLE 4

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB.

G - General Learning Ability	100.2	18.2	54-135	.220
V - Verbal Aptitude	107.3	15.6	70-141	.243
N - Numerical Aptitude	94.8	19.6	42-140	.189
S - Spatial Aptitude	99.1	18.4	55-137	.064
P - Form Perception	99.7	17.9	58-144	.214
Q - Clerical Perception	110.8	15.3	72-151	.113
K - Motor Coordination	108.9	15.3	80-334	.071
F - Finger Dexterity	95.7	23.0	37-143	-.074
M - Manual Dexterity	91.6	24.0	25-140	-.154

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X				X			
Irrelevant									
Relatively High Mean		X				X	X		
Relatively Low Standard Dev.		X				X	X		
Significant Correlation with Criterion									
Aptitudes to be Considered for Trial Norms		V				Q	K		

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes V, Q and K at trial cutting scores were able to differentiate between the 64% of the sample considered good workers and the 36% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about one third of the sample with three-aptitude norms. For two aptitude trial norms minimum cutting scores slightly higher than one standard deviation below the mean will eliminate about one-third of the sample; for four-aptitude trial norms, cutting scores slightly lower than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. The optimum differentiation for the occupation of Coding Clerk 219.388-074 was provided by the norms of V-95, Q-95, and K-90. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .29 (statistically significant at the .01 level.)

TABLE 6
Concurrent Validity of Test Norms, V-95, Q-95 and K-90

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	7	34	41
Poor Workers	11	12	23
total	18	46	64

Phi Coefficient (ϕ) = .29 Chi Square (X^2_y) = 5.5
Significance Level = $P/2 < .01$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

SP-21
Rev. 1/66

A-P-P-E-N-D-I-X

UNITED STATES EMPLOYMENT SERVICE

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATINGS SCALE FOR _____

D. O. T. Title and Code

Directions: Please read the suggestions to raters on the back of this form and then fill in the items listed below. In making your ratings, only one box should be checked for each question.

Name of Worker (print) _____

(Last) (First)

Sex: Male___ Female___

Company Job Title: _____

How often do you see this worker in a work situation?

- ☐ See him at work all the time.
- ☐ See him at work several times a day.
- ☐ See him at work several times a week.
- ☐ Seldom see him in work situation.

How long have you worked with him?

- ☐ Under one month.
- ☐ One to two months.
- ☐ Three to five months.
- ☐ Six months or more.

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

- ☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.
- ☐ 2. Capable of low work output. Can perform at a slow pace.
- ☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.
- ☐ 4. Capable of high work output. Can perform at a fast pace.
- ☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations effeciently.

☐ 3. Can perform several different operations with reasonable efficiently.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. Considering all the factors already rated, and only these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competen t worker. Performance almost always top notch.

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FACT SHEET

Job Title:

Coding Clerk (clerical) 219.388-074

Job Summary:

Converts items of information from market research questionnaire replies into numerical codes for processing by key punch units, using predetermined coding system.

Work Performed:

Receives work assignment and instructions from supervisor: Reports to supervisor's desk and receives packs of pre-stacked questionnaires (identified and referred to by preassigned job number), code sheet to be used to code specific predesignated answers to questions on each questionnaire in the pack, and appropriate verbal instructions. Carries assignment back to work table.

Codes assigned questions: Reads answer to appropriate question on questionnaire. Visually scans code sheet to locate column number and designated code for that answer. Records with red pencil the designated code alongside given answer on "open end" questions and/or merely circles appropriate code (already pre-coded on questionnaire) on "closed end" questions. May "hand tab" answers to questions on questionnaires. Prepares hand tab tally sheet by ruling appropriate columns on columnar paper. Records and tallies the actual number of times each various category of answer was given in reply to a basic question or questions on questionnaire. May record designated code on slip sheet rather than on questionnaire and staple to each questionnaire. May "pull codes" by recording a tally of the various answers given to specific questions for which there is no designated code. May "edit" questionnaires by drawing a diagonal line with a blue pencil through the appropriate space which is to be deleted from questionnaire according to code sheet instructions.

Effectiveness of Norms:

Only 64% of the nontest-selected workers used for this study were good workers; if the workers had been test selected with the S-410 norms, 74% would have been good workers. 36% of the nontest-selected workers used for this study were poor workers; if the workers had been test selected with the S-410 norms, only 26% would have been poor workers.

Applicability of S-410 Norms:

The aptitude test battery is applicable to jobs which include a majority of duties described above.

GPO 941-087

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